

REMARKS

In the Office Action, the Examiner rejected claims 1-40. The claim rejections are fully traversed below. The claims have been amended to correct typographical errors and further clarify the subject matter regarded as the invention. Claim 11 has been cancelled and claims 41-47 have been added. Claims 1-10 and 12-47 are now pending.

Reconsideration of the application is respectfully requested.

REJECTION OF CLAIMS 1-40 UNDER 35 USC §103

In the Office Action, the Examiner rejected claims 1-40 under 35 USC §103 as being unpatentable over the admitted prior art in view of RFC 2002 Perkins, ED Mobile IP, ('RFC 2002' hereinafter). In the teleconference with the Examiner on April 23, 2002, the Examiner indicated that the rejections were based on the "Mobile IP" reference, pp. 1-55 rather than RFC 2002, ('Mobile IP' hereinafter). This rejection is fully traversed below.

As described in the Background section of Applicant's specification, the Mobile IP Management Information Base (MIB) defines a set of variables that can be examined or configured by a manager station. This accounting information is typically stored on the corresponding network device (e.g., Home Agent or Foreign Agent) and therefore each network device may be periodically examined by the manager station. In other words, storage and updating of accounting information is typically dispersed among the network devices. Although this information may be periodically polled by the manager station, this process is not dynamically performed. Moreover, such variables have not been implemented for the purposes of billing users associated with these mobile nodes. See Background section, pp. 3-4. The art cited by the Examiner generally discloses such a system.

In accordance with various embodiments of the invention as claimed in claim 1, an accounting request is sent to a centralized server by a network device (e.g., Home Agent or a Foreign Agent) to update accounting information associated with the mobile node. Since this information is centralized, it is possible to generate bills for a mobile node using the accounting information. The cited art, separately or in combination, neither discloses nor suggests the claimed invention. For instance, the cited art neither discloses nor suggests the use of a server that can receive accounting requests from various network devices (e.g., Home Agents and/or Foreign Agents) in order to record accounting information associated with various mobile nodes. In fact, the cited art discloses a system in which information stored at a network device such as a Home Agent or Foreign Agent is polled periodically. Accordingly, the cited art teaches away from the use of a dynamic system in which information is centralized at a server and updated through the use of accounting requests sent by network devices such as Home Agents and Foreign Agents in association with various Mobile Nodes.

With respect to claims 1, 3, 10, 13, 23, 27, 37, and 39, the Examiner admits that the admitted prior art neither discloses nor suggests sending an accounting request including the counter to a server adapted for recording accounting information associated with the mobile node. The Examiner seeks to cure the deficiencies of the admitted prior art with the Mobile IP reference, referring to page 15, lines 1-5. However, Applicant was unable to locate a reference that discloses or suggests sending by a network device of an accounting request identifying a mobile node and including a counter associated with a mobile node's activity (and updated by the network device) to a server adapted for recording accounting information associated with the mobile node. Rather, page 15, lines 1-5 of Applicant's reference copy of "Mobile IP" relates to the clearing of Mobile IP counters that may be used for debugging. For instance, commands such as show ip mobile traffic referred to on page 15, lines 1-5 and page 5 are used to monitor and maintain Mobile IP. In other words, these are commands that are used periodically to monitor, set up and maintain various settings on a Home Agent or Foreign Agent. In no manner does the Mobile IP reference disclose the use of a counter in the manner claimed. Moreover, the Mobile IP reference neither discloses nor suggests the sending of an accounting request to a server adapted for recording accounting information associated with a mobile node. Accordingly, it is respectfully submitted that the Examiner has failed to prove a prima facie case of obviousness. Accordingly, it is submitted that claims 1, 3, 10, 13, 23, 27, 37, and 39 are patentable over the cited references.

With respect to claims 2, 5, 9, 15-17, 20, 25, 29-31, and 34, the Examiner admits that the admitted prior art neither discloses nor suggests that the counter indicates a number of packets received by the mobile node or a number of packets sent from the mobile node. Again, the Examiner refers to the Mobile IP reference, stating that the reference teaches a counter that indicates a number of packets and number of bytes received and sent to the mobile node. As described above, the prior art discloses a system in which accounting information may be polled by a manager station. The prior art teaches away from a system in which accounting requests are used to update accounting information at a central server. Accordingly, Applicant respectfully submits that claims 2, 5, 9, 15-17, 20, 25, 29-31, and 34 are patentable over the cited references.

With respect to claims 4, 26, 28, 38, and 40, the Examiner claims that the admitted prior art teaches a server that is adapted for sending an accounting reply to a network device in response to an accounting request, citing page 3, lines 4-10, lines 25-30. Applicant respectfully traverses this assertion. Rather, page 3, lines 4-10 disclose the sending of a packet from and to a mobile node. Similarly, lines 25-30 merely disclose the use of SNMP and a manager station to examine or configure accounting information stored on a network device (e.g., Home Agent). Thus, the admitted prior art does not disclose or suggest the sending of an accounting request by the network device or the sending of an associated accounting reply by the server to the network device. Moreover, the Examiner admits that the admitted prior art fails to teach that the accounting reply acknowledges logging of accounting information pertaining to the mobile node. The Examiner refers to the registration of the mobile node with its Home Agent and acknowledgement response (e.g., registration reply). However, such a registration reply merely indicates that a registration is complete. A registration reply neither discloses nor suggests acknowledging logging of accounting information pertaining to a mobile node in response to an accounting request including at least one counter associated with the accounting information. Accordingly, Applicant respectfully asserts that claims 4, 26, 28, 38, and 40 are patentable over the prior art.

Dependent claims 6-7, 14, 18, 32, 8, 19, 33, 11, 21, 35, and 24 depend from one of the independent claims and are therefore patentable over the admitted prior art in view of the cited art for at least the same reasons. However, the dependent claims recite additional limitations that further distinguish them from the cited references. Hence, it is submitted that the dependent claims are patentable over the cited art.

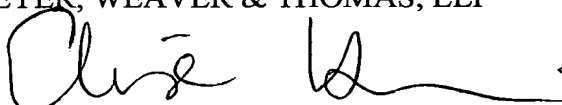
Based on the foregoing, it is submitted that the independent claims are patentable over the cited references. In addition, it is submitted that the dependent claims are also patentable for at least the same reasons. The additional limitations recited in the independent claims or the dependent claims are not further discussed as the above discussed limitations are clearly sufficient to distinguish the claimed invention from the admitted prior art and the Mobile IP reference. Thus, it is respectfully requested that the Examiner withdraw the rejection of claims 1-40 under 35 USC §103(a).

SUMMARY

Reconsideration of the application and an early Notice of Allowance are earnestly solicited. If there are any issues remaining which the Examiner believes could be resolved through either a Supplemental Response or an Examiner's Amendment, the Examiner is respectfully requested to contact the undersigned attorney at the telephone number listed below.

Applicants hereby petition for an extension of time which may be required to maintain the pendency of this case, and any required fee for such extension or any further fee required in connection with the filing of this Amendment is to be charged to Deposit Account No. 50-0388 (Order No. CISCPO77)

Respectfully submitted,
BEYER, WEAVER & THOMAS, LLP


Elise R. Heilbrunn
Reg. No. 42,649

BEYER, WEAVER & THOMAS, LLP
P.O. Box 778
Berkeley, California 94704-0778
Tel. (510) 843-6200

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1. (Once Amended) A network device which supports Mobile IP and is configured to send an accounting request, the accounting request identifying a mobile node, the network device comprising:

a memory; and

a processor coupled to the memory, wherein the network device is adapted for updating a counter associated with the mobile node's activity, the network device adapted for sending the accounting request identifying the mobile node and including the counter to a server adapted for recording accounting information associated with the mobile node using the counter, the network device being a Home Agent supporting the mobile node or a Foreign Agent to which the mobile node has roamed.

2. The network device as recited in claim 1, wherein the counter indicates at least one of a number of packets received by the mobile node and a number of packets sent from the mobile node.

3. (Once Amended) A server configured to receive an accounting request from a network device which supports Mobile IP, the accounting request identifying a mobile node, the server comprising:

a memory; and

a processor coupled to the memory, wherein the server is adapted for storing accounting information for a plurality of mobile nodes and logging accounting information associated

with the mobile node in response to the accounting request received from the network device, the network device being a Home Agent or a Foreign Agent, the accounting request including at least one counter associated with the accounting information.

4. The server as recited in claim 3, wherein the server is adapted for sending an accounting reply to the network device in response to the accounting request, the accounting reply acknowledging logging of the accounting information pertaining to the mobile node.

5. The server as recited in claim 3, wherein the counter indicates a number of packets that have been sent to the mobile node.

6. The server as recited in claim 3, wherein the counter indicates a number of packets that have been sent from the mobile node.

7. The server as recited in claim 3, wherein the counter indicates a number of registrations that have been accepted.

8. The server as recited in claim 3, wherein the counter indicates a total service time for the mobile node.

9. The server as recited in claim 3, wherein the counter indicates at least one of a number of bytes that have been sent to the mobile node and a number of bytes that have been sent from the mobile node.

10. The server as recited in claim 3, wherein the plurality of mobile nodes are associated with a plurality of network devices.

12. The server as recited in claim 3, wherein the server is a TACACS+ or a RADIUS server.

13. (Once Amended) In a network device which supports Mobile IP, a method of updating accounting information for a mobile node operating according to Mobile IP Protocol, comprising:

composing a request packet for the mobile node, the request packet identifying the mobile node and including at least one counter associated with accounting information pertaining to the mobile node; and

sending the request packet to a server adapted for performing accounting for the identified mobile node using the counter in response to the request packet.

14. (Once Amended) The method as recited in claim 13, further comprising [including]:

receiving a reply packet for the mobile node identified in the request packet from the server, the reply packet acknowledging logging of the accounting information pertaining to the mobile node.

15. The method as recited in claim 13, wherein the request packet includes at least one counter associated with the accounting information.

16. The method as recited in claim 13, wherein the counter indicates a number of packets that have been sent to the mobile node.

17. The method as recited in claim 13, wherein the counter indicates a number of packets that have been sent from the mobile node.

18. The method as recited in claim 13, wherein the counter indicates a number of registrations that have been accepted.

19. (Once Amended) The method as recited in claim 13, wherein the counter indicates a total service time for the mobile node.

20. The server as recited in claim 13, wherein the counter indicates at least one of a number of bytes that have been sent to the mobile node and a number of bytes that have been sent from the mobile node.

21. The method as recited in claim 13, wherein the network device is a Home Agent or a Foreign Agent.

22. The method as recited in claim 13, wherein the server is a TACACS+ or a RADIUS server.

23. (Once Amended) The method as recited in claim 13, further comprising [including]:

receiving a data packet from the mobile node, wherein composing the request packet is performed in response to receiving the data packet.

24. (Once Amended) The method as recited in claim 23, further comprising [including]:

forwarding the data packet to another network device.

27. The method of claim 13, wherein composing a request packet for the mobile node is triggered by an accounting event.

26. The method of claim 25, wherein the accounting event is a new registration or the termination of a registration.

27. (Once Amended) In a server, a method of updating accounting information for a mobile node operating according to Mobile IP Protocol, comprising:

receiving a request packet from a network device operating under Mobile IP Protocol, the request packet identifying the mobile node and including at least one counter associated with accounting information pertaining to the mobile node; and

logging the accounting information for the mobile node identified in the request packet using the counter of the request packet.

28. (Once Amended) The method as recited in claim 27, further comprising [including]:

sending a reply packet for the mobile node identified in the request packet, the reply packet acknowledging logging of the accounting information pertaining to the mobile node.

29. (Once Amended) The method as recited in claim 27, further comprising [including]:

generating a bill for Mobile IP services from the accounting information.

30. The method as recited in claim 27, wherein the counter indicates a number of packets that have been sent to the mobile node.

31. The method as recited in claim 27, wherein the counter indicates a number of packets that have been sent from the mobile node.

32. The method as recited in claim 27, wherein the counter indicates a number of registrations that have been accepted.

33. The method as recited in claim 27, wherein the counter indicates a total service time for the mobile node

34. The server as recited in claim 27, wherein the counter indicates at least one of a number of bytes that have been sent to the mobile node and a number of bytes that have been sent from the mobile node.

35. The method as recited in claim 27, wherein the network device is a Home Agent or a Foreign Agent.

36. The method as recited in claim 27, wherein the server is a TACACS+ or a RADIUS server.

37. (Once Amended) A computer-readable medium having thereon computer readable instructions for updating accounting information for a mobile node, the instructions comprising:

instructions for composing a request packet for the mobile node, the request packet identifying the mobile node and including at least one counter associated with accounting information pertaining to the mobile node; and

instructions for sending the request packet to a server adapted for performing accounting for the identified mobile node using the counter in response to the request packet.

38. (Once Amended) The computer-readable medium as recited in claim 37, further comprising [including]:

instructions for receiving a reply packet for the mobile node identified in the request packet, the reply packet acknowledging logging of the accounting information for the mobile node.

39. (Once Amended) A computer-readable medium having thereon computer readable instructions for updating accounting information for a mobile node, the instructions comprising:

instructions for receiving a request packet from a network device, the request packet identifying the mobile node and including at least one counter associated with accounting information pertaining to the mobile node; and

instructions for logging the accounting information for the mobile node using the counter.

40. (Once Amended) The computer-readable medium as recited in claim 39, further comprising [including]:

instructions for sending a reply packet for the mobile node identified in the request packet, the reply packet acknowledging logging of the accounting information for the mobile node.

41. The network device as recited in claim 1, wherein the network device is adapted for sending the accounting request including the counter to the server when a packet is sent by the mobile node or received by the mobile node.

42. The network device as recited in claim 1, wherein the accounting request further includes a value associated with the counter.

43. The network device as recited in claim 2, wherein the packets received by the mobile node and sent by the mobile node are intercepted by the network device.

44. The server as recited in claim 3, wherein the accounting request further includes a value associated with the counter.

45. The server as recited in claim 8, wherein the total service time is a total of one or more registration lifetimes for the mobile node.

46. The server as recited in claim 10, wherein each of the plurality of network devices is a Home Agent or a Foreign Agent.

47. A network device which supports Mobile IP and adapted for updating accounting information for a mobile node operating according to Mobile IP Protocol, comprising:

means for composing a request packet for the mobile node, the request packet identifying the mobile node and including at least one counter associated with accounting information pertaining to the mobile node; and

means for sending the request packet to a server adapted for performing accounting for the identified mobile node using the counter in response to the request packet.